ABSTRACT

Satellite-Enhanced Personal Communications Experiments

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As an initial step in exploring **the** opportunities afforded by **the** merger of satellite-based and land-based networks, Bellcore and JPL conducted several experiments utilizing NASAs Advanced Communications Technology Satellite (ACTS) and JPLs ACTS Mobile Terminal (AMT). Experimental goals fell into three categories: a) demonstrate personal communications applications, b) demonstrate interoperability among multiple *wireless* networks and the Public Switched Telecommunications Network (PSTN), and c) evaluate new protocol mechanisms **for data communications using** wireless links. We describe the performance of Point-of-Sale, e-mail, FAX, and call control applications, where the communication path passed through up to four networks: a wireless packet data network, the Satellite network, the PSTN, and a wireless cellular network.

One important element of satellite-terrestrial interoperability is the efficiency of data communications protocols. Most protocols in use today (e.g., TCP/IP) have been optimized for wireline channels; their use over wireless networks presents significant new challenges. The characteristics of wireless channels -- increased error, longer packet delay, and limited bandwidth -- affect the design of the protocol. We describe experimental results for different protocol mechanisms and parameters, such as acknowledgment schemes and packet sizes, that demonstrate the types of protocol needed for efficient use of wireless satellite-terrestrial networks.